Hīoi | MiNT
Mindfulness Meditation
& Brainwave Training

Participant Information Sheet

Study title: Mindfulness Meditation and Neurofeedback Training (MiNT) for Pain Relief in Knee Osteoarthritis: A Feasibility and Safety Randomized Control Trial.

Locality:
School of Physiotherapy,
University of Otago, New Zealand.

Ethics committee ref.:
2021 EXP 11367

Lead investigator(s):
Dr Ramakrishnan Mani, School of Physiotherapy, University of Otago
Dr Sharon Awatera (Ngāti Porou, Ngāti Kahungunu)
Associate Professor Nicola Swain, School of Physiotherapy, University of Otago
Professor Dirk De Ridder, Otago Medical School, University of Otago

Contact phone number:
0800 687 489

You are invited to take part in a study evaluating the feasibility and safety of mindfulness meditation and Neurofeedback (brainwave) training for pain relief and improving function in people living with knee osteoarthritis. Whether or not you take part is your choice. If you don't want to take part, you don't have to give a reason, and it won't affect the care you receive. If you do want to take part now but change your mind later, you can pull out of the study at any time.

This Participant Information Sheet will help you decide if you would like to participate. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide, you may want to talk about the study with other people, such as family, whānau, friends, or healthcare providers. Feel free to do this.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 12 pages long, including the Consent Form. Please make sure you have read and understood all the pages.

WHAT IS THE PURPOSE OF THE STUDY?

Purpose: This study aims to evaluate the feasibility and safety of Neurofeedback (brainwave) training and mindfulness meditation training compared to usual care for improving pain and function in people with knee osteoarthritis. We will seek participants' experiences participating in this trial.

Study outcomes: Based on this study's results, we will design a large clinical trial to test the effectiveness of these novel treatments (compared to usual care) for improving pain and function in people living with knee osteoarthritis.

Mindfulness meditation training (MMT) effectively reduces chronic pain, in general, but its effect is unknown to reduce pain in knee OA. MMT involves focussed attention to the changing sensations of the body (usually the breath) and non-reactive monitoring of arising sensory events. MMT can positively change brain and psychological functions that can improve pain.

Neurofeedback (Brainwave) Training can help learn to self-control activity of a brain region responsible for suppressing sensory signals from the knee joint. The training procedure involves recording the real-time electrical activity of a selected brain region by a computer software system. Then the computer provides sound feedback as a reward every time the brain activity reaches a set threshold. This procedure helps individuals learn to self-control the brain activity responsible for pain relief when repeated over time.

WHO ARE WE SEEKING TO PARTICIPATE IN THE PROJECT?

Eligibility criteria: We are seeking 60 adults (45-85 yrs) with a diagnosis of knee osteoarthritis and with significant pain (present daily) and functional difficulties for a minimum duration of 3 months. You are not eligible to participate if you have any of the following:

- Inflammatory arthritis (e.g., Rheumatoid arthritis, Gout)
- Underwent knee joint replacement or knee surgery or waiting/scheduled to undergo surgery within the next four months.
- Joint (steroid) injections (in the past 3 months) or
- Hyaluronic acid joint injections in the past 6 months.
- Pain in the legs due to blood vessel narrowing.
- Neurological conditions - Stroke, Multiple sclerosis, Spinal cord/nerve injuries, Neuropathy, seizures.
- Soft tissue knee injuries (last three months).
- Cognitive impairments (e.g., Dementia/Alzheimer's disease).
- Unstable medical or psychiatric conditions
- Untreated heart disease, Uncontrolled/untreated hypertension
- Alcohol or substance abuse
- Hearing loss, tinnitus, untreated ear infections.
- Presence of electronic implants or metal implants in the head and neck region
- Recent or current pregnancy

WHAT WILL MY PARTICIPATION IN THE STUDY INVOLVE?

As shown in the table below, if you will be required to attend the following study stages.

<table>
<tr><th>Stage-1</th><th>Stage-2</th><th>Stage-3</th><th>Stage-4</th><th>Stage-5</th></tr>
<tr><td>Screening

15-20 minutes approx.</td><td>Baseline assessment

One 2-hour session .</td><td>Training sessions

Four 1-hour sessions/week for 3 consecutive weeks.</td><td>Post-training assessment

One 2-hour session immediately post-treatment in the 4th week.</td><td>Follow-up assessment

One 2-hour session at 3 months post-training completion.</td></tr>
<tr><td rowspan="2">Preliminary screening (10 minutes via phone or online survey)

and

Detailed eligibility screening following consent (10 minutes)</td><td rowspan="2">Brief confirmatory screening (10 minutes)

Questionnaires.

Physical performance testing.

Pain Sensation Testing.

Brain activity, Heart rate and blood pressure, oxygen levels recordings.</td><td rowspan="2">Randomized to one of the study groups

<u>Group-1</u>: Mindfulness Meditation Training.
OR

<u>Group-2:</u> Brainwave Training.
OR

<u>Group-3:</u> Usual care (continue as you usually would do)</td><td>repeat baseline assessment</td><td>repeat baseline assessment</td></tr>
<tr><td colspan="2">One hour-interview</td></tr>
</table>

<u>Stage-1:</u> Eligibility screening

<u>Preliminary screening</u>. Volunteers who expressed interest in taking part in the study will undergo a brief preliminary screening (5-10 min) via telephone or an online questionnaire.
<u>Detailed screening</u>: If you satisfy the initial eligibility criteria, following your consent, you will undergo a detailed screening based on your health information via a secure online survey (~10 mins.) or via a paper-based survey or at an in-person session. You will be provided with an appointment to undergo a brief (final) ***confirmatory screening*** and continue with a baseline assessment if found eligible.

<u>Stage-2:</u> Baseline assessment will take a maximum of 120 minutes. The following procedures will be conducted.

<u>Questionnaires:</u> You will be asked to complete questionnaires about yourself (age, gender, ethnicity, education, well-being), your pain (location, nature, intensity, type) and how much this affects your functional activities, quality of life and well-being, psychological states (e.g., thoughts, mood, mindfulness), medications intake, the presence of other health issues if any (e.g., diabetes), sleep and physical activity levels, level of motivation and engagement with training, acceptability of the intervention. You would complete some questionnaires at home before you visit the physiotherapy school. The research assistant will assist you in

completing the questionnaires if required. You will also be asked to provide the contact details of your GP or another current provider. We will contact your health provider to inform them if any incidental findings are recorded during assessments/training sessions or if you experience any distress during study participation.

Brainwaves, heart rate, blood pressure and oxygen levels: You will need to wear a cap with electrodes attached to it (see Picture1). The assessor will explain the process and obtain your permission before putting the cap on your head. Your brain activity will be recorded for 10 minutes while you rest in a comfortable chair with your eyes closed. The researcher will apply electrode gel to your scalp to capture better signal quality. Your brain activity will also be recorded while the researcher applies repeated light touches to your wrist region using a plastic filament. You will wear an electrode strap around your chest to record your heart activity. Blood pressure and oxygen levels will also be recorded using standard bedside equipment.

Picture 1. Brain wave testing cap with electrodes

Physical performance testing: You will be asked to perform a range of physical tasks as fast as you can. For example: Sit to Stand Task and walk for 6 minutes on a surface level. You can stop performing the task as you wish. You will also be asked to rate your pain intensity on a 0–100-point scale, where 0 = No pain and 100 = Worst imaginable pain, at the start, during and following each task. You will wear an electrode strap around your chest to record your heart activity, and you will wear a finger sensor measuring oxygen levels in your blood.

Pain sensation testing: To record your pain sensitivity**,** a range of sensations will be applied over your most painful knee joint and the wrist region (for comparison purposes). The following test procedures will be administered.

- Repeated light touches with a thin and blunted nylon filament - You will be asked to tell us whether you feel a sensation of touch or pain. If you feel pain on repeated contacts, you will be asked to rate your pain intensity on a 0–100-point scale, where 0 = No pain and 100 = worst imaginable pain.

- Pressure to pain sensation testing- Pressure will be gradually applied using a rubber-tipped pressure device. You will be asked to indicate immediately when the pressure sensation changes to discomfort or when you first feel pain. This procedure will be carried out when you are resting in your leg region and immediately following 2 minutes of hand immersion in a cold-water bath maintained at ~5^{o}C.

Stage-3: Training/Intervention

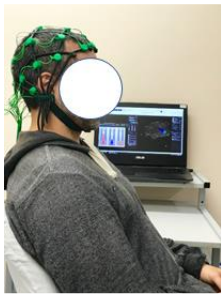
Following the baseline assessment, you will be randomly assigned to receive one of the groups below:

- Mindfulness meditation (MM) training group Or
- Brainwave (Neurofeedback) training group Or
- Usual care (No MM or NF training) group.

You will have equal chances of being assigned to one of the three groups, and you cannot change the group. But if you are assigned to receive the usual care group (i.e., continue as you usually do), you will be offered one of the training at the end of the study should you wish.

Group-1: Mindfulness Meditation Training (MMT). A brief MMT regimen will be used in this study. The brief MMT regimen will consist of twelve 20 minutes sessions administered for three successive weeks with four consecutive sessions each week. A trained research team member will conduct the training. During each session, you will be instructed to focus on the sensation of each breath occurring at the tip of the nose. On progression, you will be instructed to broaden their focus to the "full flow of the breath", including bodily sensations. You will instruct participants to acknowledge thoughts, feelings, and emotions as they arise without judgment and "simply return their attention back to the breath sensations".

Group-2: Neurofeedback (Brainwave) training. Neurofeedback (Brainwave) training involves recording your brain activity through the electrode cap in real-time. When your brain activity reaches a desired threshold, the machine will recognize and automatically provide a sound as a reward. Your brain will spontaneously respond to the reward sound and will be able to maintain the state of brain activity around the threshold, which is believed to be beneficial for pain relief. **Number of training sessions:** You will be required to attend a total of twelve training sessions (1-hour each, four sessions per week, for three consecutive weeks) in the School of Physiotherapy laboratory (325 Great King Street, Dunedin). You will have to wear a cap with electrodes attached to it on your head (see Picture *2*). The researcher will ask permission before touching your head at each session. The researcher will apply electrode gel to your scalp to capture better signal quality. During this time, you will be asked to fill in some questionnaires about any side effects you might have perceived from the previous sessions. Following the setup, you will receive treatment for 30 minutes at each session while you rest (see Picture *2*). You will be asked to close your eyes and relax for *30 minutes* without falling asleep. The neurofeedback computer program will play a distinct sound when your brain activity reaches the desired threshold. This distinct sound will be a reward for your achievement.



Picture 2. Neurofeedback training set-up

Group- 3: Usual care control group. You will continue to receive healthcare interventions and carry out self-management strategies. You will be asked to refrain from practising any mindfulness/meditation strategies during the study period. You will be contacted weekly to record healthcare interventions that you received and self-management strategies carried out. At the end of the study, we will offer you the chance to undergo either brainwave training or mindfulness meditation training, and you will be able to choose the treatment.

Blinding: The researcher conducting the baseline, post-training and follow-up assessments will not know the type of training you receive (i.e., assessors are blinded to the group). This blinding will help us avoid bias from the assessor on measurements of your health status.
You are kindly requested not to disclose your group to the assessor until you complete all assessments following training.

Stage-4: Post-training assessment (in the 4th week)

In the 4th week, you will be required to attend an assessment session, which will take ~2 hours at the School of Physiotherapy. The same tests done at the baseline assessment session will be repeated.

Stage-5: Follow-up assessment (3 months following training completion)
You will be required to attend an assessment session of ~2 hours at the physiotherapy school, three months following the training completion. The same tests that were done before the treatment sessions will be repeated.

Interviews: You will be invited to an interview (in-person or zoom or telephone) as soon as practicable after the intervention to capture your experiences participating in this trial: barriers and facilitators in participating in the trial; perceptions/acceptability towards the intervention and the research procedures, preferences for study site, the perceived value of the study and acceptability of interventions as potential clinical treatments for the management of the knee OA. Māori participants will be interviewed separately by Dr Sharon Awatera (Ngāti Porou, Ngāti Kahungunu). The focus of the interview will be the Māori perceptions of how assessment and treatment practices are acceptable to a Māori worldview. The interview will use an open-ended question. You will be able to talk freely. You can refuse to answer any question(s) if you wish. The interview will be recorded with audio recorders. The recording will be written out word for word. You can comment on your written-out interview if you wish. After completion of the written-out interview, the audio recording will be deleted.

WHAT I CAN AND CANNOT DO DURING THE STUDY PHASES?

The following actions will affect the training conditions. Therefore, we request that you ***avoid***:

- Eating large meals for 2 hours before the session
- Drinking alcohol for 24 hours before the session
- Smoking/use of any form of nicotine products for 4 hours before the session
- Consuming caffeinated drinks within 1 hour before the session
- Applying any hair products (oil, gel) before the session (for group-1 participants only)

All participants will be requested to complete a brief questionnaire regarding their compliance with the above actions. The training session would be rescheduled at a suitable time if participants report non-compliance.

You will be offered refreshments (e.g., tea/coffee or juice) at each session.

WHAT ARE THE POSSIBLE BENEFITS AND RISKS OF THIS STUDY?

Both mindfulness meditation and neurofeedback training effectively manage chronic pain, in general. There are very minimal known risks or adverse events associated with training used in this study. The common side-effects of neurofeedback training reported by previous studies include short-lasting headaches. Other risks include that there may be no benefits, including no changes to your pain or functional levels, or any initial improvements may wear off. Your brain activity is recorded using the electrode cap, a safe and harmless procedure. Application of electrode gel may cause inconvenience, and you are welcome to use the shower facilities at the school.

We do not anticipate any discomfort following the test procedures in pain sensation testing. You may feel momentary pain, tingling, or pins and needles sensation in your hand during or immediately following immersion in a cold-water bath. These ranges of sensations should usually disappear quickly following the testing. A slight reddening of the skin may stay following pain sensation testing, and it should go within minutes to hours of testing.

You will be closely monitored for your responses during all the testing procedures, and sufficient rest will be provided between each testing procedure. Any side effects of the assessments and training will be formally recorded and addressed if medical attention is required.

WHO PAYS FOR THE STUDY?

The New Zealand Health Research Council funds this study.

There will be no costs to you for participating in the study. You will receive in total $200 vouchers/gift card ($10 per hour of session) at the end of the study as a reimbursement for your travel and parking expenses. If you are in the **usual care group (group-3)**, you will receive in total $80 vouchers/gift card ($10 per hour of session) at the end of the study as a reimbursement for your travel and parking expenses.

WHAT IF SOMETHING GOES WRONG?

If you were injured in this study, you would be eligible **to apply** for compensation from ACC just as you would be if you were injured in an accident at work or at home. This does not mean that your claim will automatically be accepted. You will have to lodge a claim with ACC, which may take some time to assess. If your claim is accepted, you will receive funding to assist in your recovery.

If you have private health or life insurance, you may wish to check with your insurer that taking part in this study won't affect your cover.

Any Incidental findings/observations of potential clinical significance that are unexpectedly discovered during the research duration will be notified to you and your GP.

WHAT ARE MY RIGHTS?

- Your participation in this study is voluntary.
- You may withdraw from this project at any time and without any disadvantage to you of any kind. Besides, the study staff may decide to withdraw you from the study if there are any side effects from the assessment or treatment or if they have any other concerns.
- You have the right to access the information collected about you as part of the study.
- You will have full rights to correct or withdraw the information until the research is completed or we begin to analyse the data.
- We will inform you if any new information becomes available during the study that may impact your health.
- You will have the right to request and access any of your screening and safety monitoring results during the study that does not impact the scientific validity of the study.

WHAT HAPPENS AFTER THE STUDY OR IF I CHANGE MY MIND?

The research staff will record information about you and your study participation during this study. This includes the results of various measures (e.g., pain, function, mood, response to pain testing, brain activity) through questionnaires and assessments.

Identifiable Information: Identifiable information is any data that could identify you (e.g., your name, date of birth, or address). Only researchers involved in the research program will access your identifiable information.

De-identified (Coded) Information: To ensure your personal information is kept confidential, information that identifies you will not be included in any report generated by the researcher. Instead, you will be determined by a code. The researcher will keep a list linking your code with your name to be identified by your coded data if needed.

The study results may be published in an international scientific journal or presented, but not in a form that would reasonably be expected to identify you. Only a summary of the data will be mentioned in the research publication. The data included in the publication will in no way be linked to any specific person, and your identity will not be recorded with the data. You are welcome to request a copy of the study results. These will be available once all the data is analysed, approximately 1.5 years following the commencement of the study, nominally in the second quarter of 2023.

Future Research Using Your Information:

The data collected from this study may be helpful for future research. Any new research would have to get ethical approval. Your coded information may be used for future research. Your coded data may also be used for other medical and scientific research unrelated to the current study to answer questions formulated after the data collection. This future research may be conducted overseas. You will not be told when future research is undertaken using your information. Your information may be shared widely with other researchers. Your information may also be added to data from other studies to form much larger sets of data. You will not get reports or additional information about any research done using your information. Your information may be used indefinitely for future research unless you withdraw your consent. However, it may be extremely difficult or impossible to access your information or withdraw consent for its use once your information has been shared for future research.

Security and Storage of Your Information:

Your identifiable information is held at the University of Otago during the study. After the study, it is transferred to a secure archiving site, stored for ten years, and then destroyed. Your coded information will be entered into electronic case report forms. Coded study information will be kept in secure, cloud-based storage indefinitely. All storage will comply with local and international data security guidelines.

Risks to privacy: Although efforts will be made to protect participants privacy, absolute confidentiality of information cannot be guaranteed. Even with coded and anonymised information, there is no guarantee that participants cannot be identified. The risk of people accessing and misusing participants information (e.g., making it harder for a participant to get or keep a job or health insurance) is currently very small but may increase in the future as people find new ways of tracing information. Considering this, any privacy breach, you will be notified by the principal investigator.

Risks:

Although efforts will be made to protect your privacy, absolute confidentiality of your information cannot be guaranteed. Even with coded and anonymised information, there is no guarantee that you cannot be identified. The risk of people accessing and misusing your information (e.g., making it harder for you to get or keep a job or health insurance) is currently minimal but may increase in the future as people find new ways of tracing information.

Rights to Access Your Information:

You have the right to request access to your information held by the research team. You also have the right to request that any information you disagree with be corrected.

You may access other study-specific information before the study is over, but this could result in you being withdrawn from the study to protect the study's scientific integrity.

If you have any questions about the collection and use of information about you, you should ask the researcher.

Rights to Withdraw Your Information:

You may withdraw your consent for the collection and use of your information at any time by informing the Study Investigator.

If you withdraw your consent, your study participation will end, and the study team will stop collecting information from you.

If you agree, information collected up until your withdrawal from the study will continue to be used and included in the study. You may ask for it to be deleted when you withdraw unless you withdraw after the study analyses have been undertaken.

WHO DO I CONTACT FOR MORE INFORMATION OR IF I HAVE CONCERNS?

If you have any questions, concerns, or complaints about the study at any stage, you can contact:

Name: Dr Ramakrishnan Mani **Position**: Senior Lecturer (Principal investigator) **Department:** School of Physiotherapy, University of Otago, Dunedin.	**Phone number:** 0800 687 489 **Email**: mintstudy@otago.ac.nz
Name: Dr Sharon Awatere (Ngāti Porou, Ngāti Kahungunu) **Position:** Co-principal investigator The Health Boutique Ltd, New Zealand.	**Phone number:** 06 844 6678 **Email**: sharonawa74@gmail.com
Name: Professor Dirk De Ridder **Position**: Neurosurgery, Co-principal investigator **Department:** Department of Surgical Sciences, University of Otago, Dunedin.	**Phone number:** 03 470 9337 **Email**: dirk.deridder@otago.ac.nz
Name: Dr Divya Adhia **Position:** Research Fellow, co-investigator **Department:** School of Physiotherapy, University of Otago, Dunedin	**Phone number:** 03 470 9337 **Email:** divya.adhia@otago.ac.nz
Name: Dr Nicola Swain **Position:** Associate Professor, co-investigator. **Department:** School of Physiotherapy, University of Otago, Dunedin	**Email:** Nicola.swain@otago.ac.nz

If you want to talk to someone who isn't involved with the study, you can contact an independent health and disability advocate on:

Phone: 0800 555 050
Fax: 0800 2 SUPPORT (0800 2787 7678).
Email: advocacy@advocacy.org.nz
Website: https://www.advocacy.org.nz/

For Māori health support, please contact :

Name: Dr Sharon Awatere (Ngāti Porou, Ngāti Kahungunu)
Position: Co-principal investigator.
Telephone number:
Email: sharonawa74@gmail.com

You can also contact the health and disability ethics committee (HDEC) that approved this study on:

Phone: 0800 4 ETHICS
Email: hdecs@moh.govt.nz

The Health and Disability Ethics Committee: 2021 EXP 11367

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Study title: Mindfulness Meditation and Brainwave Training [MiNT] for Pain Relief in Knee Osteoarthritis: A Safety and Feasibility Randomized Control Trial.

Consent Form

By signing this form, you indicate your consent to the following:

I have read, or have had read to me, and I understand the Participant Information Sheet.		
I have had enough time to think about whether or not to participate in this study.		
I have had a chance to use a legal representative, whanau/ family support, or a friend to help me ask questions and understand the study.		
I am satisfied with the answers I have been given regarding the study, and I have a copy of this consent form and information sheet.		
I understand that taking part in this study is voluntary (my choice) and that I may pull out from the study at any time without this affecting my medical care.		
I consent to the research staff collecting and processing my information, including information about my health.		
I understand the risks associated with the testing and treatment procedures explained in the Participant Information Sheet.		
I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.		
Group-1 Mindfulness Meditation Group: I know that I will be given vouchers/gift card (*a value of 200$*) to cover travel expenses associated with study participation. **Group-2 Brainwave Training Group:** I know that I will be given vouchers/gift card (*a value of 200$*) to cover travel expenses associated with study participation. **Group-3 Usual care (control) group:** I know that I will be given vouchers/gift card (*a value of 80$*) to cover travel expenses associated with study participation.		
I understand the compensation provisions in case of injury during the study.		
I know whom to contact if I have any questions about the study in general.		
I understand my responsibilities as a study participant.		
I agree with my current health provider being informed of my participation in this study.		
I agree for the researchers to contact my GP or another current provider if needed to determine my eligibility for participation in the study and be notified if any incidental findings are recorded.		
I understand data collected from me in this study may be used for future research.		
If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed.	Yes ☐	No ☐
I wish to receive a summary of the results of the study.	Yes ☐	No ☐

Declaration by participant:

I hereby consent to take part in this study.

Participant's name:

Signature:

Date:

Emergency contact / Support person:

Please specify a contact person (a friend or a relative) in case of an emergency during the study participation. After completing the study phases, the contact details will be deleted from the file.

Name of a friend or relative:

Contact number:

Declaration by a member of the research team:

I have given a verbal explanation of the research project to the participant and answered the participant's questions.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name:

Signature:

Date:

The Health and Disability Ethics Committee: 2021 EXP 11367